CHAPTER 2 - ENVIRONMENTAL PROGRAM INFORMATION

The DOE's policy for the management of WIPP is to conduct its operations in a manner commensurate with applicable environmental laws and regulations, and to safeguard the integrity of the southeastern New Mexico environment. This is accomplished through radiological and nonradiological environmental monitoring, environmental compliance, and land management programs, which include monitoring wildlife populations, the WRP, and reclamation of disturbed lands. The purpose of these programs is to obtain land use permits, implement selected compliance functions such as NEPA compliance, collect data needed to detect and quantify possible impacts WIPP may have on the surrounding ecosystem and, when necessary, provide technical support in the disciplines of environmental science and land management to the DOE's CBFO.

Environmental monitoring activities at WIPP generally fall into four categories: collecting environmental samples from various matrices and analyzing them for specific radionuclides; preparing and publishing documents showing compliance with federal, state, and local regulations; evaluating whether WIPP activities cause any environmental impacts; and taking corrective action when an adverse effect on the environment is identified.

2.1 Environmental Monitoring Plan

WIPP's EMP outlines the programs that monitor the environment on, and immediately surrounding, the WIPP site. It discusses major environmental monitoring and surveillance activities at WIPP and reflects the importance of monitoring as a critical element of an effective environmental protection program. The EMP also discusses the WIPP QA/QC program as it relates to environmental monitoring. The purpose of the EMP is to outline the programs that evaluate WIPP's effect on the local ecosystem. Effluent and environmental monitoring also provide the data necessary to demonstrate compliance with applicable environmental protection regulations. The EMP sampling schedule is provided in Table 2.1.

The EMP describes the monitoring of naturally-occurring and specific anthropogenic (human-made) radionuclides. This surveillance includes monitoring worldwide fallout from historic nuclear weapons tests. The geographic scope of radiological sampling is based on projections of potential release pathways from the waste stored at WIPP. Airborne radioactivity is also monitored at Carlsbad, New Mexico, and local ranches.

The EMP also describes monitoring of VOCs, wildlife populations, meteorology, groundwater chemistry, and other nonradiological environmental parameters. In general nonradiological monitoring is conducted within or near the WIPP boundary.

Results and discussions pertaining to the monitoring programs prescribed by the EMP are provided in Chapter 4, "Environmental Radiological Program Information," and Chapter 5, "Environmental Nonradiological Program Information." DOE Order 5400.1

requires the EMP to be reviewed internally every year and updated every three years. The EMP will be updated in September 2002.

Table 2.1 - The Environmental Monitoring Plan Outlines the Sampling Schedule for the WIPP Environmental Monitoring Program

Type of Sample	Number of Sampling Locations	Sampling Frequency
Liquid effluent	1	Semiannual (oversight)
Liquid effluent	1	Quarterly (DP 831 permit [a])
Airborne effluent	3	Periodic/Confirmatory
Meteorology	2	Continuous
Atmospheric particulate	7	Weekly
Vegetation	6	Annual
Beef/Deer/Game Birds/Rabbits	Sitewide	Annual
Soil	6	Annual
Surface water	14	Annual
Groundwater	7	Semiannual
Fish	3	Annual
Sediment	12	Annual
Aerial photography	Sitewide	As needed
Volatile organic compounds (VOCs)	2	Semiweekly

[a] Monitoring compliance with the Discharge Plan, DP-831.

2.2 WIPP Environmental Monitoring Program

It is the policy of the DOE to conduct effluent monitoring and environmental surveillance programs that are appropriate for determining adequate protection of the public and the environment during WIPP operations, and to ensure operations comply with DOE and other applicable federal or state radiation standards and requirements. It is the DOE's objective that all DOE operations properly and accurately measure radionuclides in effluent streams and in the ambient environmental media. The goal of the WIPP Environmental Monitoring Program is to determine if the local ecosystem has been impacted during the predisposal and disposal phases of WIPP, and, if so, to evaluate the severity, geographic extent, and environmental significance of those impacts. The program fulfills DOE Orders 5400.1 (General Environmental Protection Program) and 5400.5 (Radiation Protection of the Public and the Environment).

The Environmental Monitoring Program monitors pathways by which WIPP-related radionuclides and other contaminants could reach the environment surrounding the WIPP site. The pathways measured include air, surface water, groundwater, sediments, soils, and biota (e.g., vegetation, game birds, and fish). In addition, the program monitors groundwater quality and the overall health of the local environment. Nonradiological portions of the program focus on the area immediately surrounding the site while radiological surveillance generally covers a broader geographical area.

In addition to monitoring for radionuclides contained in WIPP wastes, background radiation (naturally-occurring radioactivity and radioactivity associated with worldwide fallout from historic weapons testing) is also monitored. The geographic scope of radiological sampling is based on projections of potential release pathways for the types of radionuclides in WIPP wastes. Also, Carlsbad, New Mexico, and local ranches are monitored, even though release scenarios involving radiation doses to residents of these population centers are improbable.

The atmospheric pathway, which can lead to the inhalation of radionuclides, has been determined to be the most likely exposure pathway to the public from WIPP. Therefore, airborne particulate sampling for alpha-emitting radionuclides is emphasized. Air sampling results are used to trend environmental radiological levels and determine if there has been a deviation from established baseline concentrations.

Nonradiological environmental monitoring activities at WIPP consist of a comprehensive set of sampling programs designed to detect and quantify impacts of construction and operational activities. The ecological monitoring program focuses on nonradiological effects of WIPP, such as habitat disturbance.

WIPP has collected preoperational radiological and nonradiological environmental data. Baseline conditions were initially characterized by the Radiological Baseline Program. When the first shipment of waste arrived at WIPP, this program became an operational monitoring program.

Preoperational studies must be considered during environmental evaluations. These assessments have contributed to baseline data gathered during the construction phase and provided much of the foundation for long-term monitoring programs. Below are listed examples of such investigations.

- The WIPP Site Characterization Program was instituted in 1976 by Sandia National Laboratories to monitor air quality, background radiation levels, and groundwater quality.

- The WIPP Biology Program began in 1975 with site characterization studies of climate, soils, vegetation, arthropods, and vertebrates.

- Investigations of site geohydrology were conducted by the U.S. Geological Survey at the request of the DOE. In addition, the NRC issued a contract to Columbia University to perform a study of radionuclide mobility in the highly saline groundwaters of the Delaware Basin.

- Radiological monitoring of air, water, and biological media was conducted by the U.S. Atomic Energy Commission before and after the Project Gnome nuclear detonation in 1961.

2.3 Land Management Programs

On October 30, 1992, the WIPP Land Withdrawal Act (Pub. L. 109-579) became law. This act transferred the responsibility for the management of the WIPP Land Withdrawal Area from the Secretary of the Interior to the Secretary of Energy. In accordance with Sections 3(a)(1) and (3) of the act, these lands:

> . . . are withdrawn from all forms of entry, appropriation, and disposal under the public land laws . . . and are reserved for the use of the Secretary of Energy . . . for the construction, experimentation, operation, repair and maintenance, disposal, shutdown, monitoring, decommissioning, and other activities associated with the purposes of WIPP as set forth in Section 213 of the DOE National Security and Military Application of the Nuclear Energy Act of 1980 (Pub. L. 96-164); 93 Stat. 1259, 1265, and this Act.

The DOE developed the LMP (DOE/WIPP 93-004) as required by Section 4 of the Land Withdrawal Act. The LMP was developed to identify resource values, promote multiple-use management, and identify long-term goals for the management of WIPP lands until the culmination of the decommissioning phase. This plan was developed in consultation and cooperation with the BLM and the state of New Mexico. Changes or amendments to the plan require the involvement of the BLM, the state of New Mexico, and affected stakeholders, as appropriate.

Guidelines in the LMP provide for the management and oversight of WIPP lands under the jurisdiction of the DOE. Lands outside the WIPP boundary used in the operation of WIPP (e.g., groundwater surveillance well pads outside the withdrawal area) are also included in the plan. Furthermore, the plan provides for multi-agency involvement in the administration of the DOE land management actions. For example, the BLM is responsible for administering grazing leases through an MOU. The LMP is available to anyone desiring to conduct activities on lands under the jurisdiction of WIPP in addition to those involved in developing or amending existing land management actions.

The LMP encourages direct communication among stakeholders, including federal and state agencies, involved in managing the resources within, or activities impacting the areas adjacent to, the WIPP Land Withdrawal Area. It sets forth cooperative arrangements and protocols for addressing WIPP-related land management actions. Commitments contained in current permits, agreements, or concurrent MOUs with other agencies will be respected when addressing and evaluating land use management activities and future amendments that affect the management of WIPP lands.

The LMP was last reviewed in 2001. It is reviewed on a biennial basis to assess the adequacy and effectiveness of the document, or as may be necessary to address emerging issues potentially affecting WIPP lands. Affected agencies, groups, and individuals may be involved in the review process. Components of the LMP emphasize management protocols for the following issues: administration of the plan, environmental compliance, wildlife, cultural resources, grazing, recreation, energy and

mineral resources, lands/realty, reclamation, security, industrial safety, emergency management, maintenance, and work control.

2.3.1 Land Use Requests

Parties who wish to conduct activities that may impact lands under the jurisdiction of WIPP, but outside the secured fence area of the facility designated as the Property Protection Area, are required by the LMP to prepare a Land Use Request (LUR). A LUR consists of a narrative description of the project, a completed environmental review, and a map depicting the location of the proposed activity. The LUR, and associated NEPA checklists, are used to determine if applicable regulatory requirements have been met prior to the approval of a proposed project. A LUR may be submitted to the land use coordinator by any WIPP organization or outside entity wishing to complete any construction, right-of-way, pipeline easement, or similar action within the WIPP boundary or on lands used in the operation of WIPP, under the jurisdiction of the DOE. During 2001, six LURs were submitted for review and approval; all met applicable criteria and were approved.

2.3.2 Wildlife Population Monitoring

Southeastern New Mexico is home to diverse populations of plants and wildlife. Shrubs and grasses are the most prominent components of the local flora. Dominant trees include shinnery oak (*Quercus havardii*), honey mesquite (*Prosopis glandulosa*), and western soapberry (*Sapindus drummondii*). Much of the area is composed of combined dune and grassland habitats that include perennial grasses and shrubs.

According to the BLM's Resource Management Plan, 15 percent of the wildlife species identified in the area use the shinnery oak habitat, while 30 percent occupy areas consisting primarily of grasses. The juxtaposition of shinnery oak/dune habitat with grassland habitat has resulted in a diverse wildlife population.

This portion of New Mexico supports an abundant and diverse population of mammals, including black-tailed jackrabbits (*Lepus californicus*), desert cottontails (*Sylvilagus audoboni*), desert mule deer (*Odocoileus hemionus*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), badgers (*Taxidea taxis*), and striped skunks (*Mephitis mephitis*).

The habitat heterogeneity of the Los Medaños region also accounts for a wide assortment of bird species. Scaled quail (*Callipepla squamata*), mourning doves (*Zenaida macroura*), loggerhead shrikes (*Lanius ludovicianus*), black-throated sparrows (*Amphispiza bilineata*), Chihuahuan ravens *(Corvus cryptoleucus*), and a unique desert subspecies of the northern bobwhite (*Colinus virginianus*) are but a few examples of the array of avian inhabitants. Due to a scarcity of surface waters in the immediate vicinity of WIPP, migrating or breeding waterfowl are not common.

In addition, this area supports a particularly abundant and diverse population of raptors, or birds of prey. Harris' hawks (*Parabuteo unicinctus*), Swainson's hawks (*Buteo*

swainsoni), and great horned owls *(Bubo virginianus*) are species commonly found nesting in the area. Northern harriers (*Cicus cyaneus*), burrowing owls (*Athene cunicularia*), barn owls (*Tyto alba*), and American kestrels (*Falco sparverius*) are also found around the site.

Reptiles and amphibians are also found in great numbers in southeastern New Mexico. Representative of the no fewer than ten native amphibians are the tiger salamander (*Ambystoma tigrinum*), green toad (*Bufo debilis*), plain's spadefoot toad (*Spea bombifrons*), red-spotted toad (*Bufo punctatus*), and New Mexico spadefoot toad (*Spea muliplicata*). Their significance is seldom recognized until spring or summer rains, at which time they appear in extraordinary numbers.

Reptiles are more conspicuous due to their diurnal nature. Characteristic reptiles in the region include the ornate box turtles (*Terrapene ornata*), side-blotched lizards (*Uta stansburiana*), western whiptails (*Cnemidophorus tigris*), bullsnakes (*Pituophis melanoleucus*), prairie rattlesnakes (*Crotalus viridis*), and Texas horned lizards *(Phrynosoma cornutum*), a federal notice-of-review species listed under the Endangered Species Act (16 U.S.C. 1531-1544).

Birds and mammals compose the upper levels of the food chain in the natural ecosystem around WIPP. These organisms may be affected by noise and human presence as well as by changes in habitat structure due to salt impacts. Population densities are monitored annually to define normal cycles of abundance and to detect major changes in populations or communities which may be due to activities at WIPP.

Beginning in 1985, population density measurements of birds and small nocturnal mammals were performed annually to assess the effects of WIPP surface activities (e.g., construction, salt piles) on wildlife populations. Customary protocol involved comparative data analyses between two outlying or "control" plots and two experimental plots near WIPP operations. No consistent differences were found between the control and experimental plots. A Hantavirus investigation during 1994 prompted the temporary postponement of small nocturnal mammal surveys. Previous years' investigations revealed no detectable detrimental impacts from salt encroachment on the peripheral environment; therefore, annual appraisals of small mammal populations were discontinued indefinitely.

WTS personnel manage several wildlife research projects and conduct a number of general wildlife management activities. Specific wildlife populations are monitored and researched in accordance with applicable laws, agreements, and regulations. Each activity is mandated and/or supported by state and federal guidelines or by way of commitments created through interagency agreements and MOUs. Wildlife within the WIPP Land Withdrawal Area are given consideration by way of the WIPP LUR process during planning stages of projects that may disturb or encroach on wildlife habitat.

In 1979, the DOE consulted with the U.S. Fish and Wildlife Service (USF&WS) and was informed of the presence of threatened or endangered species at or near the WIPP site. However, no critical habitats for endangered species were identified at WIPP. In 1989,

the DOE again consulted with the USF&WS and was advised of no status changes since 1979.

During 1989, the DOE consulted with the New Mexico Department of Game and Fish (NMDG&F) regarding state-listed endangered species in the vicinity of WIPP. NMDG&F Regulation 657, dated January 9, 1988, listed seven birds and one reptile in one of two endangerment categories that may be present at the site.

In 1995, the USF&WS provided an updated list of threatened and endangered species for Eddy and Lea Counties, New Mexico. Included were 18 species that may be present on WIPP lands. A comprehensive evaluation in support of the second Supplemental Environmental Impact Statement (SEIS-II) (DOE/EIS-0026-S-2) was conducted in 1996 to determine the presence or absence of threatened or endangered species in the vicinity of WIPP and WIPP's effect on these species. Results indicated that activities associated with the operation of WIPP had no impact on any threatened or endangered species. The protection of threatened and endangered species is taken into consideration when planning and administering projects on WIPP lands.

WIPP, and the region surrounding it, is widely recognized for its concentration and diversity of raptors. The area is home to several raptor species of special concern, including Harris' hawks, Swainson's hawks, burrowing owls, and barn owls, as well as other species.

The DOE, the BLM, and other government agencies are keenly aware of the value and importance of protecting and monitoring raptor populations. To assist in this effort at WIPP, the BLM and the DOE established the WRP in the early 1990s to monitor, protect, and educate about raptors on the WIPP site. The WRP is administered by the WIPP Environmental Monitoring Program with input from the BLM and others. Scientific consultation, research direction, and field operations are conducted by scientists from Rocky Mountain College in Billings, Montana.

In CY 2001, research continued on long term studies of productivity and population demographics of the raptor community in and around WIPP. These studies are described in greater detail in Chapter 5.

2.3.3 Reclamation of Disturbed Lands

The DOE recognizes its responsibility pursuant to federal, state, and local environmental regulations to enhance and restore areas affected by WIPP activities, including disturbed lands accepted as part of the land transfer from the BLM.

WIPP reclamation activities are conducted in accordance with DOE Order 5400.1; the DOE Organization Act (42 U.S.C. 7112); the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1751); the WIPP Disposal Phase SEIS-II; the SEIS-I (DOE/EIS-0026-FS); the Final Environmental Impact Statement (FEIS) (DOE/EIS-0026); and all applicable reclamation requirements by federal laws and regulations, Executive Orders, MOUs, DOE Orders, and state and local laws.

Without an active reclamation program for disturbed areas, the establishment of stable ecological conditions in arid environments may require decades or centuries to achieve stability, depending on the disturbances and environmental conditions present. Reclamation activities are intended to reduce soil erosion, increase the rate of plant colonization and succession, and provide habitat for wildlife in disturbed areas. Reclamation ultimately serves to mitigate the effects of WIPP-related activities on affected plant and animal communities. The objective of the reclamation program is to reclaim lands used in the operation of WIPP that are no longer commissioned for WIPP operations. The DOE will also establish reclamation guidelines for land use requesters on a case-by-case basis.

In accordance with the LMP, WIPP follows a reclamation program and a long-range reclamation plan. As locations are identified for reclamation, WIPP personnel reclaim these areas by using the best acceptable reclamation practices. Seed mixes used reflect those species indigenous to the area with priority given to those plant species which are conducive to soil stabilization, wildlife, and livestock needs.

2.3.4 Oil and Gas Surveillance

The oil and gas industry is well established in southeastern New Mexico. Nearly all phases of oil and gas activities have occurred in the vicinity of WIPP, including seismic exploration, exploratory drilling, field development (comprised of production and injection wells), and other activities associated with hydrocarbon extraction.

The Los Medaños region, where WIPP is located, is part of the Delaware Basin. Although the Delaware Basin accounts for approximately 32 percent of lands in Eddy County, approximately 20 percent of the oil and gas wells are located within its boundaries. During 1995, oil and gas reserves in the immediate vicinity of the WIPP Land Withdrawal Area were evaluated by the New Mexico Bureau of Mines and Mineral Resources. Results from this evaluation were compiled in a report, *Evaluation of Mineral Resources at the Waste Isolation Pilot Plant Site*, March 31, 1996.

One aspect of the WIPP land withdrawal, unique to most DOE facilities, was the intent to maintain a multiple land use concept in the management of the property. However, an exception to a global multiple use strategy was required to reduce likelihood of inadvertent intrusion on the repository and to safeguard the surface infrastructure. Accordingly, all drilling and mining on the WIPP site has been prohibited. Oil and gas activities within 1.6 km (1 mi) of the WIPP boundary are monitored twice monthly to identify new activities associated with oil and gas exploration and production, including:

- Drilling
- Survey staking
- Geophysical exploration
- Pipeline construction
- Work-overs
- Changes in well status
- Anomalous occurrences (e.g., leaks, spills, accidents, etc.)

During CY 2001, WIPP surveillance teams conducted 24 scheduled surveillances with more than 100 cursory field inspections.

One exception to the prohibition of mining and drilling on the WIPP site involved two mineral leases. Under a provision contained in the Land Withdrawal Act (Public Law 102-579), these two mineral leases, consisting of 129 ha (320 ac) each, were not appropriated in the proceedings. Both tracts, located in Township 22 South, Range 31 East, Section 31, prohibit drilling within the first 1,830 m (6,000 ft) of the surface. In accordance with the WIPP Land Withdrawal Act, existing rights under these leases were not affected unless the Administrator of EPA determined, after consultation with the Secretary of Energy, that the area in question should have been purchased.

This determination was made because of the presence of an existing gas well that had been drilled directionally from the adjacent Section 6 of Township 23 South, Range 31 East. During deliberations, it was determined the DOE would condemn (withdraw from public use) the upper 1,830 m (6,000 ft) of Section 31. This action would require operators interested in accessing minerals under the section to stage drilling operations outside the WIPP boundary and directionally drill under Section 31. The condemnation of the upper 1,830 m (6,000 ft) would provide an adequate protective zone for DOE operations while still allowing the legal owner of the minerals to access the reserves. Section 4(b)(5) of the Land Withdrawal Act describes this action as follows:

> *(5) Mining:*
>
> > *(A) In general. Except as provided in subparagraph (B), no surface or subsurface mining, or oil or gas production, including slant drilling from outside the boundaries of the Withdrawal, shall be permitted at any time (including after decommissioning) on lands on or under the Withdrawal.*
> >
> > *(B) Exception. Existing rights under Federal Oil and Gas Leases No. NMNM 02953 and No. NMNM 02953 shall not be affected unless the Administrator determines, after consultation with the Secretary and the Secretary of the Interior, that the acquisition of such leases by the Secretary is required to comply with the final disposal regulations.*

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